CLAIMS

What is claimed is...

1) A method for aligning a laser transmitter system and a receiver optical system comprising:
a) placing an attenuator-and-reflector assembly on a receiver optical system;
b) reflecting a first portion of an output laser beam from a laser transmitter system into said attenuator-and-reflector assembly;
c) attenuating said first portion of said output laser beam to a power level insufficient to damage said receiver optical system and a reflector assembly of said attenuator-and-reflector assembly;
d) reflecting said first portion of said output laser beam to change direction so as to direct said first portion of said output laser beam into said receiver optical system;
e) inputting said first portion of said output laser beam into said receiver optical system;
f) directing a second portion of said first portion of said output laser beam onto a means for capturing an image located at a back focal plane of said receiver optical system to generate an image of said second portion;
g) determining a position and an intensity profile of said image of said second portion of said output laser beam using said means for capturing an image; and
h) adjusting at least one optical element of said laser transmitter system when said image of said second portion of said output laser beam does not impinge upon a desired region of a plurality of pixels of said means for capturing an image.

2) The method of claim 1 wherein steps b) through h) are repeated until said image of said second portion of said output laser beam impinges upon said desired region of said pixels.

3) The method of claim 1 wherein said at least one optical element changes a pointing direction of said output laser beam originating from said laser transmitter system.

4) The method of claim 3 wherein said pointing direction is repeatedly determined to track a change during a passage of time.

5) The method of claim 3 wherein said pointing direction is repeatedly determined to track a change resulting from a change in an environmental condition.

6) The method of claim 5 wherein said environmental condition is selected from the group consisting of temperature, humidity, pressure, and vibration.

7) The method of claim 1 wherein said at least one optical element changes a collimation of said output laser beam originating from said laser transmitter system.

8) The method of claim 7 wherein said collimation is repeatedly determined to track a change during a passage of time.

9) The method of claim 7 wherein said collimation is repeatedly determined to track a change resulting from a change in an environmental condition.

10) The method of claim 9 wherein said environmental condition is selected from the group consisting of temperature, humidity, pressure, and vibration.

11) The method of claim 1 wherein said intensity profile of said image is employed as a measure of a far-field energy profile of said output laser beam.

12) The method of claim 1 wherein said means for capturing an image is selected from the group consisting of a CCD array, an intensified CCD array, a CID array, and an IR focal plane array.

13) The method of claim 1 wherein said reflected direction of said first portion of said output laser beam is antiparallel to an original direction of said output laser beam.

14) The method of claim 1 wherein the desired location on said means for capturing an image is determined by a sequence of steps comprising:

a) pointing said receiver optical system toward a light source positioned at a distance sufficient to make said light source appear to be a point source;

b) adjusting an at least one optical element of said receiver optical system to maximize a signal from a primary LIDAR detector resulting from a first portion of light from said light source;

c) directing a second portion of light from said first portion of light from said light source onto a means for capturing an image located at a back focal plane of said receiver optical system to generate an image of said second portion; and

d) identifying a desired location of a plurality of pixels by determining said location on said means for capturing an image where said second portion of light from said light source is imaged.

15) A method for aligning a laser transmitter system and a receiver optical system comprising:

a) scattering a first portion of a laser beam from a laser transmitter system into a receiver optical system;

b) directing a second portion of said first portion of said output laser beam onto a means for capturing an image located at a back focal plane of said receiver optical system to generate an image of said second portion;

c) determining a position and an intensity profile of said image of said second portion of said output laser beam using said means for capturing an image;

d) adjusting a pointing direction of said output laser beam originating from said laser transmitter system when said image of said second portion of said output laser beam; and

e) adjusting at least one optical element of said laser transmitter system when said image of said second portion of said output laser beam does not impinge upon a desired region of a plurality of pixels of said means for capturing an image.

16) The method of claim 15 wherein steps a) through e) are repeated until said image of said second portion of said output laser beam impinges upon said desired region of said pixels.

17) The method of claim 15 wherein said at least one optical element changes a pointing direction of said output laser beam originating from said laser transmitter system.

18) The method of claim 15 wherein said at least one optical element changes a collimation of said output laser beam originating from said laser transmitter system.

19) The method of claim 15 wherein said means for capturing an image is selected from the group consisting of a CCD array, an intensified CCD array, a CID array, and an IR focal plane array.

20) The method of claim 15 wherein said reflected direction of said first portion of said output laser beam is antiparallel to an original direction of said output laser beam.

21) The method of claim 15 wherein the desired location on said means for capturing an image is determined by a sequence of steps comprising:
a) pointing said receiver optical system toward a light source positioned at a distance sufficient to make said light source appear to be a point source;
b) adjusting an at least one optical element of said receiver optical system to maximize a signal from a primary LIDAR detector resulting from a first portion of light from said light source;
c) directing a second portion of light from said first portion of light from said light source onto a means for capturing an image located at a back focal plane of said receiver optical system to generate an image of said second portion; and
d) identifying a desired location of a plurality of pixels by determining said location on said means for capturing an image where said second portion of light from said light source is imaged.